2008-08-08

5011673101-DSE1

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DTE-2DS DTE Accessory

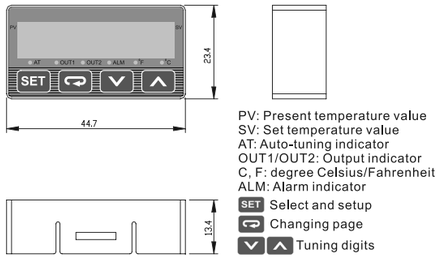
Instruction Sheet

Thank you very much for choosing DTE-2DS. Please read this instruction sheet before using your DTE-2DS to ensure proper operation. Keep this instruction sheet handy for quick reference.

■ Warning

1. Please hold the plastic terminal when installing DTE-2DS to prevent electrostatic discharge (ESD).
2. Prevent dust or metallic debris from falling into the device and cause malfunction. DO NOT modify or uninstall DTE-2DS without being permitted. DO NOT use empty terminals.
3. When installing DTE-2DS, please make sure the power of DTE main unit is switched off and insert DTE-2DS into the correct slot on DTE main unit.
4. Make sure you install DTE-2DS correctly before switching on the power; otherwise serious damage may occur.
5. DO NOT touch the terminals or repair the device when the power is on; otherwise an electric shock may occur.

■ Product Outline & Dimension



PV: Present temperature value
SV: Set temperature value
AT: Auto-tuning indicator
OUT1/OUT2: Output indicator
C, F: degree Celsius/Fahrenheit
ALM: Alarm indicator
SET Select and setup
Changing page
Tuning digits

■ Electrical Specifications

Input power	DC +5V
Power consumption	Max. 0.5W
Display	Single row 7-segment LED display, two 4 bits PV: red SV: green
Keys	4 keys for selecting, changing pages and tuning
Terminal connection	Can only be inserted into the “Display and Setup Unit” slot on DTE main unit

■ Setting up Parameters

Switching modes: DTE-2DS is in ”operation mode” when the power is switched on, Press SET to enter “regulation mode”. Press SET for more than 3 seconds in the operation mode to enter “initial setting mode”. Press SET in the regulation mode or initial setting mode to return to the operation mode.

PV/SV: Displaying the present value and set value. Use ▽ △ to change the set value.

How to set up: Use ↻ in the three modes to select the parameter to be set up and ▽ △ to modify the settings. Press SET to save the setting.

How to switch modes by keys and set up parameters:

Regulation Mode —Press SET for less than 3 secs→ Operation Mode —Press SET for more than 3 secs→ Initial Setting Mode

Press SET ← Press SET

Regulation Mode	Operation Mode	Initial Setting Mode
PAGE Select channel Press ↻ ▽	1234 Use ▽ △ to set up target temperature (SV) Press ↻ ▽	InPt Set up input type Press ↻ ▽
AT Auto-tuning (Set it up when in PID control and RUN) Press ↻ ▽	r-S Control loop RUN/STOP Press ↻ ▽	tPUn Set up temperature unit Press ↻ ▽

Regulation Mode	Operation Mode	Initial Setting Mode
P PID proportional band (Set it up when in PID control) Press ↻ ▽	Ptrn Set up start pattern (Set it up when in PID control) Press ↻ ▽	tP-H Set up upper limit of temperature Press ↻ ▽
I Set up PID Ti value (Set it up when in PID control) Press ↻ ▽	STEP Set up start step (Set it up when in PID program control) Press ↻ ▽	tP-L Set up lower limit of temperature Press ↻ ▽
d Set up PID Td value (Set it up when in PID control) Press ↻ ▽	SP Set up the position of decimal point (**Not** for thermocouple R, S, B type) Press ↻ ▽	CtrL Select control mode Press ↻ ▽
PdoF or ioF Set up PD/PID control offset (When in PID control, set up PdoF when Ti=0. AT sets up ioF automatically when Ti≠0.) Press ↻ ▽	AL1H or ALAH Without/with group INB Set up upper limit of Alarm 1 Press ↻ ▽	S-o1 Set up output 1 (Heating, cooling or proportional output) Press ↻ ▽
HS-1 Hysteresis for output 1 (Set it up when in ON/OFF control) Press ↻ ▽	AL1L or ALAL Without/with group INB Set up lower limit of Alarm 1 Press ↻ ▽	S-o2 Set up output 2 (Heating, cooling or alarm output) Press ↻ ▽
HS-2 Hysteresis for output 2 (Set it up when in ON/OFF control) Press ↻ ▽	AL2H Without group INB Set up upper limit of Alarm 2 Press ↻ ▽	ALA1 or ALAn Without/with group INB Set up Alarm 1 mode Press ↻ ▽
Pd-1 Control cycle for output 1 (Set it up when in PID/programmable PID/manual control) Press ↻ ▽	AL2L Without group INB Set up lower limit of Alarm 2 Press ↻ ▽	ALA2 Without group INB Set up Alarm 2 mode Press ↻ ▽
Pd-2 Control cycle for output 2 (Set it up when in PID/programmable PID/manual control) Press ↻ ▽	Lof For locking the keys on the panel Press ↻ ▽	CoPY Set up copy function Press ↻ ▽
CoEF Ratio of output 1 & output 2 when in dual output control. Pb2 = Pb1 × COEF (Set it up when in PID/programmable PID + dual output) Press ↻ ▽	out1 For displaying and tuning the value of output 1 (Displayed when in PID/programmable PID/manual control RUN) Press ↻ ▽	C-SL Select ASCII/RTU communication format Press ↻ ▽
dEAd Set up the overlapped area for dual output (dead band) (Set it up when in dual output) Press ↻ ▽	out2 For displaying and tuning the value of output 2 (Displayed when in PID/programmable PID/manual control RUN) Press ↻ ▷ Return to “target temperature”	C-no Set up communication address Press ↻ ▽
tPoF For tuning temperature offset Press ↻ ▽		bPS Set up communication baud rate Press ↻ ▽
oAAY Set up upper limit for control output Press ↻ ▽		LEn Set up data length Press ↻ ▽
oALn Set up lower limit for control output Press ↻ ▽		PrEY Set up parity bit Press ↻ ▽

Regulation Mode	Operation Mode	Initial Setting Mode
ALAd Set up delay time for alarm output Press ↻ ▽		StoP Set up stop bit Press ↻ ▷ Return to “set up input type”
ErHc For tuning upper limit of analog output (Displayed when in analog output) Press ↻ ▽		
ErLo For tuning lower limit of analog output (Displayed when in analog output) Press ↻ ▽		
ProP Set up positive/negative proportional output (Set it up when in proportional output control) Press ↻ ▷ Return to “auto-tuning”		

■ Types of Input Sensors & Temperature Range

1. Set up input sensor: Enter parameter InPt (see “Setting up Parameters” section for details) in “initial setting mode” and select an input sensor (see Table 1).
2. Set up temperature range: Enter parameter tP-H and tP-L (see “Setting up Parameters” section for details) in “initial setting mode” to set up the temperature range.
3. Set up the position of decimal point: Enter parameter SP (see “Setting up Parameters” section for details) in “operation mode”. The position of decimal point will change the temperature range. The screen displays only 4 digits; therefore, you have to set “0” in this parameter if you wish to display values bigger than 999 or smaller than -99. The setting will not be saved. Default = 1.

Input Sensor Type	Display	Range
Platinum resistance (Cu50)	Cu50	-50 ~ 150°C
Platinum resistance (Ni120)	ni20	-80 ~ 300°C
Platinum resistance (Pt100)	Pt	-200 ~ 850°C
Platinum resistance (JPt100)	JPt	-20 ~ 400°C
Thermocouple TXK type	tXK	-200 ~ 800°C
Thermocouple U type	U	-200 ~ 500°C
Thermocouple L type	L	-200 ~ 850°C
Thermocouple B type	b	100 ~ 1,800°C
Thermocouple S type	S	0 ~ 1,700°C
Thermocouple R type	r	0 ~ 1,700°C
Thermocouple N type	n	-200 ~ 1,300°C
Thermocouple E type	E	0 ~ 600°C
Thermocouple T type	t	-200 ~ 400°C
Thermocouple J type	J	-100 ~ 1,200°C
Thermocouple K type	K	-200 ~ 1,300°C

Table 1

■ Setting up Control Output

For PID Control Application:

1. Set up 2 outputs: Enter parameter S-o1 and S-o2 in “initial setting mode” (see “Setting up Parameters” section for details). Set up one of the two parameters as HEAt or Cool of control output.
2. Set up control type: Enter parameter CtrL in “initial setting mode” (see “Setting up Parameters” section for details) and set it up as PID (PID) control.
3. Set up parameters: In “regulation mode”
   - Parameter AT : Can be set up when parameter r-S is set as run . When AT is set as on , the program will calculate parameters P , I , d , Lof and CoEF automatically and save them.
   - Parameter P , I and d .

- Parameter PdoF and PdoF : PdoF can be set up when parameter ----C is set as "0". PdoF can be set up when ----C is not "0".
- Parameter Pd-1 and Pd-2 : Pd-1 (control cycle for output 1) can be set up when parameter S-o1 is set as HEAt (heating) or CooL (cooling) output. Pd-2 (control cycle for output 2) can be set up when parameter S-o2 is set as HEAt (heating) or CooL (cooling) output.
- Parameter CoEF and dEAd : Can be set up when parameter S-o1 and S-o2 are set as HEAt (heating) or CooL (cooling) output. (The settings in S-o1 and S-o2 have to be different.)

For ON/OFF Control Application:

1. Set up 2 outputs: Enter parameter S-o1 and S-o2 in "initial setting mode" (see "Setting up Parameters" section for details). Set up one of the two parameters as HEAt or CooL of control output.
2. Set up control type: Enter parameter Ctrl in "initial setting mode" (see "Setting up Parameters" section for details) and set it up as onoF (ON/OFF) control.
3. Set up parameters: In "regulation mode"
   - Parameters tS-1 and tS-2 : tS-1 (hysteresis for output 1) can be set up when parameter S-o1 is set as HEAt (heating) CooL (cooling) output. tS-2 (hysteresis for output 2) can be set up when parameter S-o2 is set as HEAt (heating) or CooL (cooling) output. You can only set up tS-1 when S-o1 and S-o2 are set as HEAt or CooL at the same time.
   - Parameter dEAd : Can be set up when parameter S-o1 and S-o2 are set as control output, and the settings in S-o1 and S-o2 are different, e.g. output 1 is HEAt (heating), and output 2 is CooL (cooling).

For Manual Control Application:

1. Set up 2 outputs: Enter parameter S-o1 and S-o2 in "initial setting mode" (see "Setting up Parameters" section for details). Set up one of the two parameters as HEAt or CooL of control output.
2. Set up control type: Enter parameter Ctrl in "initial setting mode" (see "Setting up Parameters" section for details) and set it up as mAnU (manual) control.
3. Set up parameters: In "regulation mode"
   - Parameter Pd-1 and Pd-2 : Pd-1 (control cycle for output 1) can be set up when parameter S-o1 is set as HEAt (heating) or CooL (cooling) output. Pd-2 (control cycle for output 2) can be set up when parameter S-o2 is set as HEAt (heating) or CooL (cooling) output.
   - Parameter oUt1 and oUt2 (in "operation mode") : oUt1 can be set up when parameter S-o1 is set as HEAt (heating) or CooL (cooling) output. oUt2 can be set up when parameter S-o2 is set as HEAt (heating) or CooL (cooling) output.

For Programmable PID Application:

1. Set up 2 outputs: Enter parameter S-o1 and S-o2 in "initial setting mode" (see "Setting up Parameters" section for details). Set up one of the two parameters as HEAt or CooL of control output.
2. Set up control type: Enter parameter Ctrl in "initial setting mode" (see "Setting up Parameters" section for details) and set it up as ProG (programmable) control.
3. Set up parameters: In "regulation mode"
   - Parameter ----P , ----I and ----d .
   - Parameter PdoF : PdoF can be set up when parameter ----C is set as "0".
   - Parameter Pd-1 and Pd-2 : Pd-1 (control cycle for output 1) can be set up when parameter S-o1 is set as HEAt (heating) or CooL (cooling) output. Pd-2 (control cycle for output 2) can be set up when parameter S-o2 is set as HEAt (heating) or CooL (cooling) output.
   - Parameter CoEF and dEAd : Can be set up when parameter S-o1 and S-o2 are set as HEAt (heating) or CooL (cooling) output. (The settings in S-o1 and S-o2 have to be different.)
   - Parameter Ptrn and StEP (in "operation mode") : Can be set up when parameter r-S is set as StoP or PStP .

For Proportional Output Application: In this application, output 1 has to be analog output.

1. Set up output function: Enter parameter S-o1 in "initial setting mode" (see "Setting up Parameters" section for details) and set it as ProP (proportional) output.
2. Set up parameters: In "regulation mode"
   - Parameter ProP

For Upper/Lower Limits of Control Output:

1. Set up upper limit: Enter parameter oAAY in "regulation mode" (see "Setting up Parameters" section for details). Range: Lower limit ~ 100%.
2. Set up lower limit: Enter parameter oALn in "regulation mode" (see "Setting up Parameters" section for details). Range: 0 ~ upper limit %.

For Alarm Application:

1. Set up output function (only when there is group INB): Enter parameter S-o2 in "initial setting mode" (see "Setting up Parameters" section for details) and set it as ALAn (alarm) output.
2. Set up alarm type: Enter parameter ALAn (with INB) or ALA1 and ALA2 (without INB) in "initial setting mode". See Table 2 for more details on the alarm output.
3. Set up parameters: In "operation mode"
   - Parameter ALAH and ALAL : Can be set up when there is group INB.
   - Parameter AL1H , AL1L , AL2H and AL2L : Can be set up when there is no group INB.
4. Set up delay alarm output: Enter parameter ALnd in "regulation mode" (unit: second). The alarm will be enabled only when the temperature reaches the alarm output condition, and the condition remains until the delay time is reached.

DTE main unit offers 2 groups of alarm output, each with 12 alarm modes in the initial setting mode. When SV is higher or lower than SV, the alarm output will be enabled. See the table in the next column for the explanations on the 12 alarm output modes.

Note: AL-H and AL-L include AL1H, AL2H and AL1L, AL2L.

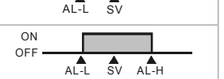
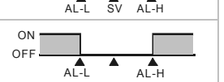
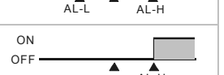
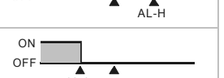
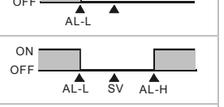
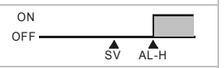
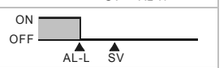
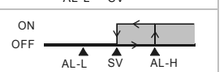
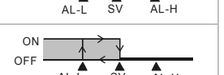
SV	Alarm Mode	Alarm Output Operation
0	No alarm	OFF
1	Alarm output is enabled when the temperature reaches upper and lower limits: The alarm will be enabled when PV exceeds SV + AL-H or falls below SV – A L-L.	
2	Alarm output will be enabled when the temperature reaches the upper limit: The alarm will be enabled when PV exceeds SV + AL-H.	
3	Alarm output will be enabled when the temperature reaches the lower limit: The alarm will be enabled when PV falls below SV – A L-L.	
4	Alarm output will be enabled when PV is between SV + AL-H and SV – AL-L.	
5	Alarm output will be enabled when the temperature reaches the absolute value of the upper and lower limits: The alarm will be enabled when PV exceeds AL-H or falls below AL-L.	
6	Alarm output will be enabled when the temperature reaches the absolute value of the upper limit: The alarm will be enabled when PV exceeds AL-H.	
7	Alarm output will be enabled when the temperature reaches the absolute value of the lower limit: The alarm will be enabled when PV falls below AL-L.	
8	Upper/lower limit standby alarm: The alarm will be enabled when PV reaches SV and further exceeds SV + AL-H or falls below SV – AL –L.	
9	Upper limit standby alarm: The alarm will be enabled when PV reaches SV and further exceeds SV + AL-H.	
10	Lower limit standby alarm: The alarm will be enabled when PV reaches SV and further falls below SV – AL-L.	
11	Upper limit hysteresis alarm: The alarm will be enabled when PV exceeds SV + AL-H. The alarm will be disabled when PV falls below SV.	
12	Lower limit hysteresis alarm: The alarm will be enabled when PV falls below SV – AL-L. The alarm will be disabled when PV exceeds SV.	

Table 2

■ Setting up Communication

1. Set up communication: Enter parameter C-SL , C-no , bPS , tEn , PrEY and StoP in "initial setting mode" (see "Setting up Parameters" section for details) and select your desired communication settings.
2. DTE series temperature controller is able to set up or read communication settings through DTE-2DS.

■ Selecting Channel

1. Select channel: Enter parameter PAGE in "regulation mode" (see "Setting up Parameters" section for details) and select the channel to be monitored.
2. How does it work: DTE main unit has maximum 8 channels which can be connected to 8 input sensors at the same time. The 8 input channels belong to group INA and INB, each group with 4 input channels. INB is optional accessory; therefore if INB is not inserted in DTE, DTE will only show 4 channels.

■ Setting up Copy Function

1. Set up the function: Enter parameter CoPY in "initial setting mode" (see "Setting up Parameters" section for details) and select the function you desire.
2. How does it work: The copy function allows a DTE main unit to copy its parameters (including the values set in the parameter and communication settings) to another DTE main unit through DTE-2DS. Follow the steps below:
   a. Insert DTE-2DS into the DTE main unit to be copied. Enter parameter CoPY in "initial setting mode" and select rEAd, and DTE-2DS will read the parameters in the DTE main unit. Next, you will see Good on the screen, indicating that the copy is successful. FAIL indicates the copy fails. Press ∧ to return to "operation mode" and you will see the present temperature value (PV) and set temperature value (SV).
   b. Switch off DTE and withdraw DTE-2DS. Insert DTE-2DS into another DTE main unit. Enter parameter CoPY in "initial setting mode" and select Writ . DTE-2DS will write the parameters into it. Next, you will see Good on the screen, indicating that the writing-in is successful. FAIL indicates the writing-in fails. Press ∧ to return to "operation mode" and you will see the present temperature value (PV) and set temperature value (SV).

■ Locking the Keys on Panel

1. Lock the keys: Enter parameter LoC in "operation mode" (see "Setting up Parameters" section for details) and select the function you desire.
2. How does it work: LoC1 indicates locking all the keys on the panel. LoC2 indicates that you can only modify the set temperature value (SV), and all other functions are locked.
3. Press SET and ↵ at the same time to unlock the keys.

■ Analog Output & Temperature Tuning

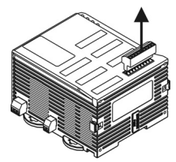
1. Set up analog output tuning: Enter parameter CrAt and CrLo in "regulation mode" (see "Setting up Parameters" section for details) and tune the parameter to the desired output value.
2. Temperature offset tuning: Enter parameter tPoF in "regulation mode" and tune the parameter to the displayed temperature value.
3. How does it work:
   a. Tuning analog output: For example, if you would like to have accurate 4 ~ 20mA of output, you can set up output 0% by manual control, connect the output to ampere meter and tune parameter CrLo making the meter point to 4mA. Next, set up output 100% by manual control and tune parameter CrAt making the meter point to 20mA.
   b. Tuning temperature offset: This allows the displayed temperature to plus or minus 1 offset value.

■ Error Message

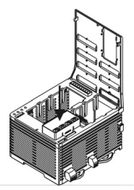
Error	PV	SV
Input sensor not connected	no	Cont
Internal communication error	inCo	FAIL
Output error	Err	out
Input error	Err	inPt
Storage error	Err	Pron
Channel disabled	dIS	PAGE
Channel being initialized	dtE	inIt

■ How to Install

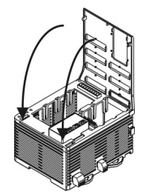
① Remove all the terminal blocks on the panel.



② Uncover the panel and insert DTE-2DS to the "operation interface" slot.



③ Cover up the panel.



④ Insert the terminal blocks back to their positions.